Sempervirens
Spring/Summer 2023 | The Quarterly of the Virginia Native Plant Society

# Volunteers put brakes on Mile-a-minute's advance

Last fall, VNPS member and hiker Jean Stephens spotted a patch of the invasive Mile-a-minute vine (*Persicaria perfoliata*) (MM) while hiking on a remote section of Wild Oak National Recreation Trail. This was unwelcome news because Jean's discovery was the first known occurrence of this fast-growing, non-native invasive plant in the Shenandoah Mountain area of the George Washington National Forest (GWNF), and the patch had already expanded to several acres. Meg Riddle, GWNF North Zone biologist, has identified MM as a top priority invasive plant, one that gives her nightmares. This annual barbed vine can grow 26 feet a year, smothering out native plants, shrubs, and trees. It is called "Kudzu of the North."

This new infestation would be unwelcome anywhere in Virginia, but it was especially unwanted at the edge of the proposed Shenandoah Mountain National Scenic Area, one of Virginia's premier natural areas that Friends of Shenandoah Mountain and the Virginia Wilderness Committee have been working for decades to protect though federal legislation. Left unchecked, the MM vine would produce seed that could be unintentionally spread by hikers, bikers, runners, and equestrians along the popular Wild Oak Trail and throughout the 150-mile trail network on Shenandoah Mountain.

Chris Bowlen of the Shenandoah Chapter holds up a few Mile-a-minute vines.

Mile-a-minute on the loose.

Trail users and naturalists who understand what a serious threat MM poses to the high level of biodiversity on Shenandoah Mountain joined forces to eradicate it from this newly discovered site near West Augusta. Friends of Shenandoah Mountain, Potomac Appalachian Trail Club (PATC), Virginia Native Plant Society Shenandoah Chapter, and Virginia Master Naturalists Headwaters Chapter united and reached out to Riddle at GWNF to make a plan to tackle the MM patch. The Forest Service agreed to spray the patch with pre-emergent herbicide in the spring and then volunteers would pull young plants in early June, before they produced seed – a one-two punch. We scheduled the pull on June 3, National Trails Day, when all trail users are asked to "leave a trail better than they found it."

Friends of Shenandoah Mountain put out a call to all trail users to gather at the site on June 3 to pull MM for an hour. Our goal was to get 50 trail users. Since many trail users had never seen MM and had no idea what a threat it poses to native plant communities, our second goal was to educate them and teach them to spot new occurrences along the trail network. Early detection is critical, and the more informed trail users, the better.

***(See Mile-a-minute, page 2)***

A volunteer shows off a bunch of Mile-a-minute vines that were removed from the forest floor in the GW National Forest.

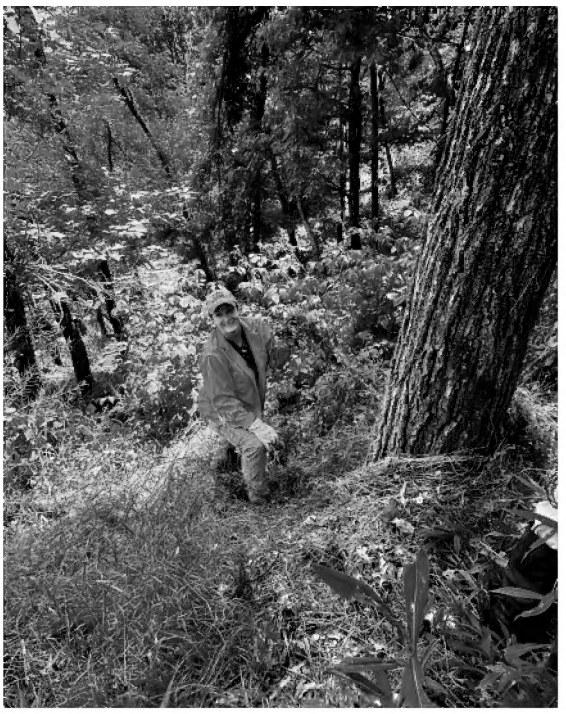
# Mile-a-minute

***(Continued from page 1)***

Executing our plan was challenging. The patch was accessible by a Forest Road, but the road was washed out and impassible. Volunteers could hike 8-10 miles round trip from various trailheads, but this was not an option many would choose. Fortunately, the Forest Service was able to fix the road, making it possible to haul volunteers to the site in 4WD vehicles.

In the weeks leading up to June 3, PATC volunteers spent many hours preparing for the big day. We used a drone to take photos from the air, GPSed and flagged the boundaries, made directional signs, cleared paths through dense vegetation to provide easier access to steep slopes where the MM grew, and cleared vegetation along four miles of newly repaired road to make it more passable.

When June 3 arrived, 33 volunteers representing a variety of trail user and naturalist groups streamed in via 4WD vehicles or on foot to begin work. In addition, we were joined by Riddle and a FS seasonal employee, as well as a reporter from the local newspaper. Chris Bowlen of VNPS instructed all the volunteers and made sure they had gloves to protect their hands from the barbed vines. We formed small groups and assigned each an area to pull. The pre-emergent spray was effective where it made contact, but we still found tens of thousands of plants to pull. Fortunately, because the plants had not produced seed, we did not need to bag and carry them out. After 3-4 hours work, volunteers had made a big dent in the population. We gathered in the shade to eat lunch and told stories about our experiences.



Volunteers were undeterred by the steep terrain as they worked to eradicate the invasive Mile-a-minute vine from the National Forest.

It is hard to say how much MM is left, but we pulled most of it. We will go back later this summer to see if more germination has occurred. Chris Bowlen said, "This can't be a one-year effort. We will need to come back next year and hit it again, but there should be far less."

It looks like the Shenandoah Mountain National Scenic Area is going to need advocates and defenders well into the future, even after federal legislation has been passed.

*Lynn Cameron is Co-chair of Friends of Shenandoah Mountain, VNPS member, and a PATC North River District Manager, along with her husband Malcolm.*

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E-mail items to Nancy Sorrells at lotswife@comcast.net.

Next submission deadline: August 15, 2023

# Ruth Douglas
## *Battling invasive plants has become her mission*

*For several years now, Society President Nancy Vehrs has been providing behind the scenes insight into the people whose lives are dedicated to telling the stories of Virginia's plants and habitats. This installment provides a look into the life of Ruth Douglas who has taken on the mission of protecting Virginia's native plants by eradicating the threat from invasive plants. Nancy caught up with Ruth earlier this year and asked her about how she developed that passion.*

Ruth Douglas in her favorite place—outdoors!

**Nancy: Provide a little background-where you grew up, went to school, career, etc.**
I was born in 1939 and grew up in northern New Jersey, about 20 miles from New York City. At the time we were the outermost town in the New Jersey suburbs surrounding New York. There was a nice park just a few blocks from the house, and my mother showed me some of her favorite spring ephemerals, including Spring Beauties and Trout Lilies (she called them dog-toothed violets). I think her knowledge and enthusiasm started me on the road to my continuing love of our wildflowers.

I went to college in northern New York state, St. Lawrence University, where I majored in biology. However I only took one botany class, which I didn't feel so enthusiastic about. The professor was rather dry, though he did take us on a couple of field trips during spring. We all had to struggle to keep up with him and take notes at the same time. Later, I attended graduate school in zoology at Syracuse University, got a master's degree in zoology, and took no further botany classes.

My career was partly teaching biology at several community colleges (California, Pennsylvania, and Virginia), but I also was a Peace Corps Volunteer in British Honduras (now Belize) and taught science at a teachers college. Right after I returned from the Peace Corps I worked for a time at the Library of Congress, but then went on to teach biology at Northern Virginia Community College. During that time I got a Ph.D. in college administration and worked in Japan for two years. I returned from Japan to work at Piedmont Virginia Community College (PVCC) until I retired in 2001.

During that time I took several field-oriented botany classes. While at PVCC, they hosted a pre-retirement seminar for state employees (including me). The one piece of advice I took away from that was that one should know what they want to do after they retire BEFORE they retire. That inspired me to think about what I wanted to do, and I finally came up with the idea that I wanted to be out in the woods learning about our wildflowers. I took several courses in plant identification and ecology to prepare me for retirement activity, and had a sabbatical at Va. Tech where I had several botany courses and also two horticulture courses because I wanted to establish a horticulture program at PVCC. One of the courses, though not about invasive plants, had a requirement that each class member would choose an invasive plant and write up an information sheet on the plant that would be used by the state Natural Heritage Program to inform the public about invasive plants. I chose Hydrilla! I don't remember why, but perhaps I was among the last to select a plant and the more interesting and well-known ones were already taken. That assignment is what steered me in the direction of invasive plant issues, and I'm kind of a compulsive teacher anyway.

At one point, VNPS needed a person to work on invasive plant issues because Ted Scott was ready to retire from that position. When I saw that, I decided to volunteer for that position, inspired by the recommendation that I choose what I wanted to do after I retired BEFORE I retired. I suspect there was not a lot of competition for that position.

After I retired, I got more involved, and volunteered to have a table for VNPS for an event Tech sponsored for several years: a Farm and Family Day. It was a wild success but Tech cancelled it after the year when it poured the day of the event and many cars got stuck in mud big time! That was fun because at the time, few people were aware of invasive plants, and I would ask folks who passed near our table if they were aware of invasive plants. When they said NO, I'd say, you do know one, Kudzu. That

***(See Ruth Douglas interview, page 4)***

# Ruth Douglas interview

***(Continued from page 3)***

was my poster child for years! Some probably looked at me as another personification of the Ancient Mariner, who would fix people with his beady eye and tell them his life story.

I did a lot of outreach events at the time, and then Rod Walker invited Mary Lee Epps and me to be involved in establishing the Blue Ridge PRISM (Partnerships for Regional Invasive Species Management). So, then for several years she and I did a lot of outreach for the PRISM, always fun and hopefully we educated folks at various events about invasive plants. (COVID killed that activity for years.) As time went on, more of my activities about invasive plants were doing outreach for the PRISM often with Mary Lee. I think those events and tabling at the Virginia Nursery and Landscape Association annual field day were among the most fun and (hopefully) most effective work I did as the Invasive Plant Educator for PRISM. I also spoke to a number of garden clubs, and at one event in Northern Virginia I highlighted Oriental Bittersweet and had a small sample, with ripe berries, enclosed in a zip lock bag. After the talk, one person there came rushing up to me and breathlessly asked me if she could have my bittersweet sample!! She said she'd been looking all over for some for a table decoration. I decided, what the heck, and gave it to her with the firm admonition not to put it in her compost pile. I also tabled for some years at the Virginia Nursery and Landscape Association (VNLA) annual field day. I'm not sure how successful that was at educating members of the VNLA, but it was fun and interesting. Later I was involved in developing a revision to the state law about invasive plants, where we were successful at changing the noxious weed law to redefine them as any invasive plant that was not in the trade. While that may seem misguided, it enabled us to at least start with plants that were not in the trade and getting them moved to be covered by the noxious weed law.

**Nancy: What actions will make the biggest difference in combating invasive plant species?**

I consulted with Rod Walker and Beth Mizell of the Blue Ridge PRISM regarding their thoughts on what would be the most important points to make in combating invasive plants. Below is our answer:

- Educate themselves about invasive plants, and remove them from their yards, and help educate their neighbors to do the same.
- Remove highly invasive plants from the trade by changing the noxious weed law and/or working with the industry to agree to remove specific plants under sunset agreements. I personally think changing the law will have the most impact because it provides a mechanism for assessing all plants. The Advisory Group can fight it out or if they cannot remove the most highly invasive plants, then we turn to specific plant bans.
- Support local ordinances to allow communities to ban specific plants
- Encourage the public to purchase native or non-invasive plants
- Remove HOA restrictions similar to what has happened in Maryland (Low Impact Landscaping Bill passed in 2021 to allow residents of the state to opt out of high-maintenance turf lawns and install native plants and rain gardens no matter what their HOAs say.)
- Expand the number of PRISMs in the state, in part by working with VNPS chapters around the state and also working to establish PRISMs in parts of the state not covered by a VNPS chapter
- Educate the public. The more people understand the issue and which plants are problems, the more they will take them out and stop buying them. And, of course, we are hoping the provision in the bill requiring tradespersons to notify landowners that they are installing Department of Conservation listed invasive plants will help turn the tide.
- Support research. This includes biological controls such as for Ailanthus as well as advanced techniques for locating and treating invasives of all kinds.

**Nancy: What advice can you give about invasive plant species?**

Work to educate the public about the issue of invasive plants. The more people understand the issue and which plants are problems, the more they will take them out and stop buying them. And, of course, we are hoping the provision in our bill requiring tradespersons to notify landowners that they are installing DCR listed plants will help turn the tide.

Choose native plants or plants that are non-invasive for landscaping yards.

Report invasive plants. Support native plant campaigns. This is very important: STRONG advocacy to push the legislature to change the noxious weed law and implement laws/funding to support native plants, support the nursery industry as they transition away from invasive plants, provide suitable funding to support the State Invasive Species Management Plan, and adequately staff state agencies to do their part. ❖

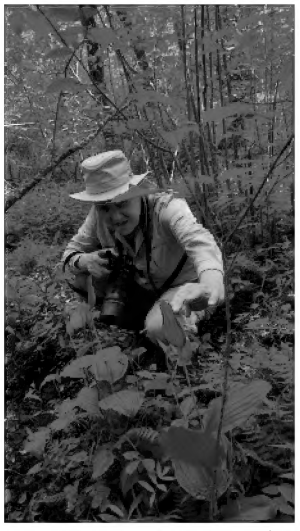
# *Spring frenzy slips into summer slowdown*

From the President
Nancy Vehrs

The frenzy of the spring wildflower season has ended as we enter the proverbial lazy days of summer. Spring came early this year, and my chapter took advantage of that fact by going for a botanical walk on March 22 at Conway Robinson Memorial State Forest in Gainesville. We were richly rewarded by the best stands we had ever seen there of Round-lobed Hepatica in full bloom. And Virginia Bluebells were beginning to flower, too.

Late March to April was our richest time for spring wildflowers in Northern Virginia. Along with some fellow botanical-loving friends, we managed to visit Ball's Bluff in Loudoun County as well as Riverbend Park in Fairfax County. Both are located along the Potomac River, rich in biodiversity. In addition to our beloved Bluebells, this is where Twinleaf, White Trout-lily, Harbinger-of-spring, Blue Cohosh, Squirrel Corn, Pink Shooting Stars, Bloodroot, and other favorite spring wildflowers thrive. Both sites are in our VNPS Registry. (Read about our Site Registry on the web at https://vnps.org/virginia-native-plant-registry-sites/.) The Bluebell Festival at Merrimac Farm Wildlife Management Area on April 8 boasted Virginia Bluebells in peak bloom. The Prince William Wildflower Society sold around 50 bluebells at its information booth there—and could have sold many more.

Shortly thereafter in April, I had the pleasure of visiting Highland County where I presented a program on "Attracting Birds with Native Plants" to the Highlands Bird and Nature Club in Monterey. Highland County, bordering West Virginia, is our least populous county and sits at a high elevation. I took along my friend Brigitte Hartke, and we enjoyed staying in the Blue Grass Valley at Eagle Annie's Cottage, a charming little Airbnb owned by club president Patty Reum. The club's program coordinator Keith Carson graciously gave us a tour of the area and even as late as April 12, very little beyond Bloodroot was blooming. It was as if we had stepped back into late winter though the air was warm. We'll have to return to this charming area during the growing season. Perhaps we should visit during the famed Maple Festival in March 2024.



Janis Stone communes with a Kentucky Lady's Slipper, left, and a closeup of *Cypripedium kentuckiense* encountered in the Hickory Hollow Natural Area Preserve.

I took a detour on the return trip from Highland County in search of Swamp-pinks (*Helonias bullata*), a rare species found in only four Virginia counties and listed as state imperiled. It has been on my bucket list for some time. *Sempervirens* editor Nancy Sorrells knew of a population in Augusta County and took Brigitte and me to visit it. The detour was well worth it as the flowers were enchanting! They were surrounded by other swamp-loving species including Skunk Cabbage and the emerging fiddleheads of ferns. Thank you for taking us to see them, Nancy!

Other spring highlights included an annual spring trip to the G. Richard Thompson Wildlife Area in Linden to enjoy the acres of Large-flowered Trillium, Yellow Lady's Slippers, and other gorgeous spring ephemerals. On May 10, Janis Stone and Brigitte accompanied me to the Northern Neck where chapter president Betsy Washington gave us a tour of Hickory Hollow Natural Area Preserve. We saw the famed Kentucky Lady's Slipper (*Cypripedium kentuckiense*), a state rare species, as well as other spring species. Betsy and husband Kevin Howe also shared with us their lovely garden in Kilmarnock. On May 19, our intrepid trio took a trip to Reddish Knob on Shenandoah Mountain where the road to the summit was lined with diverse wildflowers. This fantastic floral foray near the border with West Virginia yielded such treasures as Painted Trillium, Yellow Clintonia, Four-leaved Milkweed, Fringe Tree (oh, the fragrance!), Sundial Lupine, and Wild Sarsaparilla.

I'm always sad to see spring end and vow to see more wild flowers and wild places throughout the year and into next spring. ❖

# 2023 WOY
# *Pollination biology of Joe-Pye Weed is fascinating*

Article by W. John Hayden, Botany Chair

**Figure 1.** Tiger Swallowtail (dark morph) on Joe-Pye Weed flowers (*Eutrochium* sp.).

Joe-Pye Weeds (*Eutrochium* spp.) and the closely related Thoroughworts (*Eupatorium* spp.) are widely appreciated for their ability to attract numerous, diverse, pollinators (Figure 1). Colorful butterflies large and small, bees both native and domesticated, hummingbirds, wasps, and other insects are common floral visitors. As I wrote the article about Joe-Pye Weed in the last issue of *Sempervirens* (Hayden 2023), it occurred to me that, because Joe-Pye Weeds and their relatives attract so many pollinators, their flowers must produce both nectar and pollen to attract such a diverse array of floral visitors—some pollinators consume pollen, others sip nectar, and some do both. As I hypothesized about nectar and nectaries in Joe-Pye Weed flowers, another question came to mind: where were these supposed nectaries located? I was puzzled because I could not recall anything in my past botanical experience about the presence of nectaries in flowers of any member of Asteraceae. Hence, the inspiration for this article on pollination biology of Hollow-stem Joe-Pye Weed, the 2023 VNPS Wildflower of the Year. My focus will be on two aspects of pollination in these small flowers: the nature of their nectaries and the way in which pollen is presented to floral visitors. As it turns out, these aspects of pollination biology of *Eutrochium* and *Eupatorium* are common phenomena shared widely by other members of the family.

I believe there are three reasons why nectaries of asteraceous plants receive little mention in standard taxonomic and floristic sources: 1) the nectaries are small, 2) they are hidden on the inside of small flowers, and 3) despite their size, the external morphology of these small flowers exhibits such a multitude of characters useful for identification and classification that there is scant motivation to dig into the floral innards where the tiny nectaries are located. But, once one knows what to look for, asteraceous nectaries are not all that difficult to find in the botanical literature and, with the necessary magnification, floral nectaries are readily observed in the plants themselves. Nevertheless, I have not been able to find illustrations of the floral nectaries of any species of *Eutrochium* or *Eupatorium* but, from what I have learned, floral nectary structure is sufficiently stereotypical in the family that images from other genera will suffice here. With a modicum of chagrin, I must point out that I completely overlooked the nectary of *Helianthus tuberosus*, depicted in Figure 10 of Hayden (2023); that image is repeated here as Figure 2. And I did not have to look far to find the nectary of a *Hieracium* floret illustrated here as Figure 3—this photomicrograph was generated from a microscope slide in my own Plant Anatomy teaching collection at the University of Richmond.

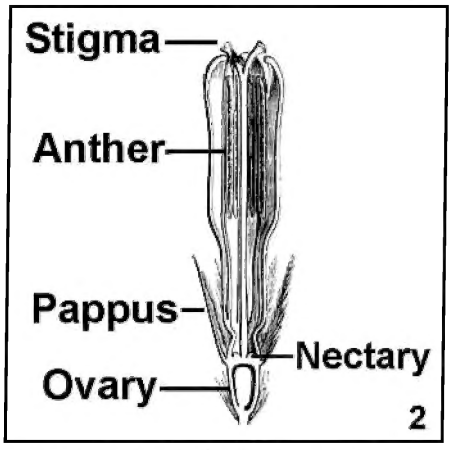



**Figure 2.** Disc floret of *Helianthus tuberosus*, longitudinal section, nectary appears as a pair of lumps atop the ovary; from Baillon (1886) *Histoire des Plantes*, vol. 8, Librairie Hachette, Paris.

In general, floral nectaries can occur as components of various floral organs, but are frequently associated with ovaries. The often overlooked floral nectaries of asteraceous florets (Figures 2, 3) occur at the apex of the inferior ovary where they take the form of a donut-like torus situated between the style base and corolla. Figure 4, a floral nectary from Purple Coneflower (*Echinacea purpurea*), provides an instructive three-dimensional bee's-eye view; further, this scanning-electron microscope-derived image reveals the fascinating detail that nectar is secreted through stomata located on its upper surface. Stomata, of course, are usually associated with leaves where they perform the function of gas exchange, permitting entry of carbon dioxide for photosynthesis while simultaneously letting water vapor escape from the plant. It is fascinating to contemplate that stomata can perform such different functions as gas exchange and nectar secretion yet retain the same basic structure.

Make no mistake, asteraceous flowers are small and their nectaries are smaller still. Diameters for the nectaries illustrated here are 0.25 mm for *Hieracium* (Figure 3) and 0.4 mm for *Echinacea* (Figure 4). How can these minute nectaries account

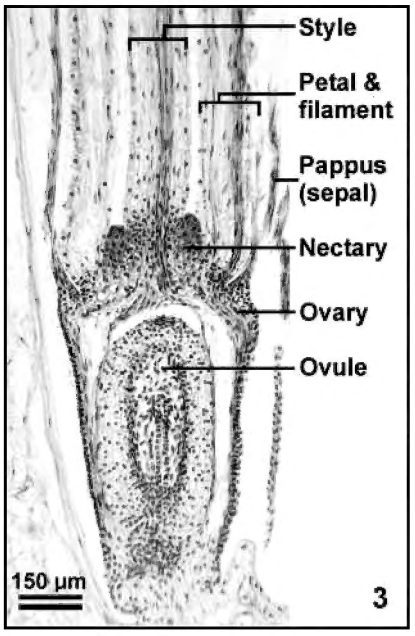



**Figure 3.** Floret of *Hieracium* sp., longitudinal section, showing nectary as in Figure 2; original photomicrograph by W. John Hayden from a slide in the University of Richmond Plant Anatomy teaching collection.

for the ability of these plants to attract multitudes of pollinators? How can these tiny bits of tissue be responsible for the "pollinator magnet" reputation of Joe-Pye Weeds and Thoroughworts, or, frankly, any other plant classified in family Asteraceae? One obvious answer to the question is that, though individually small, florets in the daisy family and, therefore, their nectaries, occur in large numbers. According to the *Flora of Virginia* (Weakley et al. 2012), each head of *Eutrochium fistulosum* contains 4-7 florets. Counting the number of heads per vigorous flowering stem of this species would be a daunting task, but from one of my photos, I did make a very conservative estimate of perhaps 500 heads; multiplying 500 heads times 5 florets per head yields an impressive total of 2,500 florets per vigorous flowering stem. Of course, not all florets open at the same time, but clearly, at any point in time during the flowering phase, Joe-Pye Weed has many open flowers available for potential pollinators. So, while the florets are small, their occurrence in many, many, copies probably explains how numerous pollinators are served.

Further, the fact that each flower

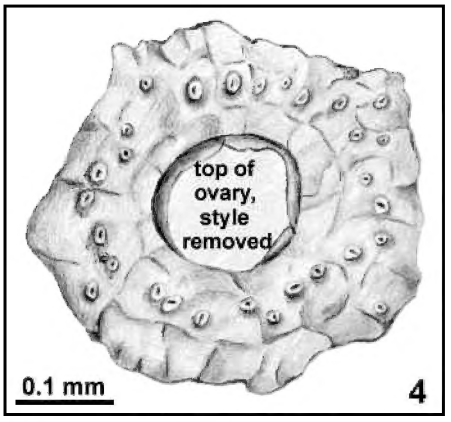



**Figure 4.** Nectary of *Echinacea purpurea* as seen from above, with style and petals removed; nectar is secreted from multiple stomata located on the upper surface; redrawn by Sheila M. Hayden from a scanning electronmicrograph published by Wick and Davis (2006).

yields only a small sip of nectar to floral visitors may, somewhat paradoxically, explain why there can be so many floral visitors present at any given point in time. Because nectar volume per floret is small, many individual florets must be probed for the pollinator to achieve satiation, consequently, time spent per flowering head (or heads) grows long—few floral visitors will be content with a quick "in and out." Consequently, at any given point in time, multiple visitors can be found patiently working the flower clusters to acquire multiple tiny sips of nectar. It seems logical to assume that time spent on a single Joe-Pye plant could correlate positively with amount of pollen picked up and amount deposited on stigmas, which are, after all, from the plant's perspective, the essential tasks of any pollinator.

Across the diversity of flowering plants, flower size often determines which animals can function as effective pollinators. Desert cacti pollinated by bats, for example, have flowers large enough to accommodate the bat's muzzle as it probes the depths of the flower. Domesticated bees are much smaller than bats, but they are just the right size to enter and pollinate Garden Foxglove flowers. Perhaps surprisingly, however, when it comes to very small flowers that occur in large clusters, flower size becomes less of a constraint on pollinator size than one might think. Small pollinators can effectively work flowers of comparable small size—but so can large pollinators because they perch on nearby flowers in the cluster while their mouthparts delve into other small flowers. This, essentially, is how large pollinators, like Swallowtail butterflies (Figure 1), operate on flower clusters of Joe-Pye Weeds. Sumacs (*Rhus* spp.), Mountain Mints (*Pycnanthemum* spp.), and umbel-bearing plants (family Apiaceae) constitute just a few additional examples of "pollinator magnet" plants with large clusters of many small flowers that are visited by insects large and small.

Flower visitation alone, however, does not necessarily result in effective pollination. To be an effective pollinator, a floral visitor must encounter pollen in one flower, transport it to another flower and, in one way or another, smear some of that pollen on the receptive surface of that other flower's stigma. The way pollinators encounter pollen of Joe-Pye Weed or, for that matter, almost any member of Asteraceae, is quite unusual—and pollen presentation is another topic that was glossed over in my discussion of flower structure of Joe-Pye Weed in the last issue of *Sempervirens* (Hayden 2023).

The process of pollen presentation in Asteraceae works like this: First (Figure 5a), anthers contain mature pollen shortly before the corolla opens; at this stage the tightly appressed stigmas occupy the space enclosed by the five anthers. As the corolla opens (Figure 5b), anthers shed their pollen toward their internal surfaces (i.e., pollen release is introrse); significantly, the newly released pollen grains are in contact with the external, non-receptive, surface of the stigmas. Soon, the style elongates (Figures 5b and 5c), progressively pushing masses of pollen toward the top of the floret. It is at this stage (Figures 5b and 5c) that pollen becomes accessible to floral visitors. Said another way, pollen reaches the top of the floret because the stigmas push it forward, functioning like a ramrod. At a scale too fine to be shown in the diagram, external surfaces of stigmas bear minute "sweeping

***(See Joe-Pye-weed page 8)***

## Who was Joe Pye?

Although historical documentation appears sparse, according to legend, Joe Pye was a Native American healer from Salem, Massachusetts, who used concoctions from *Eutrochium* spp. to treat typhus. Grammatically, therefore, Joe Pye is proper noun; consequently, in my opinion, both parts of his name should be capitalized for the common names of various Joe-Pye Weed species.

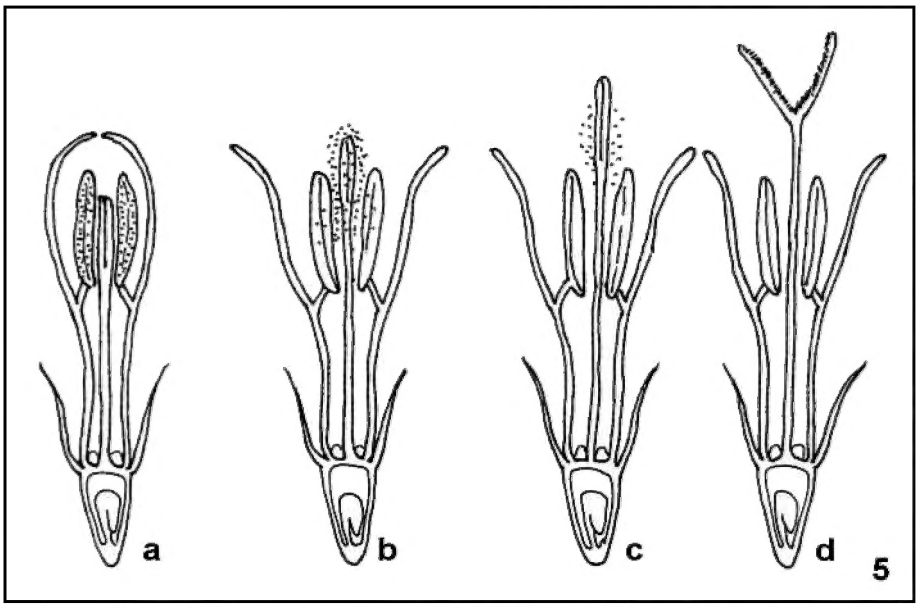



**Figure 5.** Pollen presentation in Asteraceae; see text for explanation; redrawn and modified by W. John Hayden from an image published by Roque et al. (2009).

# *Joe-Pye Weed*

***(Continued from page 7)***

hairs" that, broom-like, assist in upward displacement of pollen. A day or so later, after the pollen has been dispersed by floral visitors, the paired stigmas diverge from each other (Figure 5d), thus exposing their pollen-receptive surfaces upon which pollen-laden floral visitors may smear a few pollen grains.

Once again, we have a critical aspect of pollination biology of Asteraceae that depends on large numbers of small florets; on any given day during the flowering period, some flowers will be in the "male" pollen-presentation stage (Figures 5b and 5c), and others will be in the "female" pollen receptive stage (Figure 5d). As floral visitors take their time, rummaging for tiny sips of nectar among the numerous flowering heads, some florets of each stage will be encountered and the process of pollination will be completed.

Somehow, all the details described above, numerous small flowers and their smaller but equally numerous nectaries, work in concert with the elaborate choreography of introrse anthers, ramrod styles, and late-diverging stigmas, to accomplish pollination. It may seem overly elaborate, it may seem like something that Rube Goldberg imagined, but it is real and it works; asteraceous florets get pollinated and subsequently produce seeds for the next generation of plants. Not only does this complex pollination process work, it works very well—if it didn't we would not have 32,000 species and 1,900 genera of Asteraceae! ❖

LITERATURE CITED

Hayden, W. J. 2023. Yes, Virginia, Joe-Pye Weed is in the daisy family. Sempervirens Winter 2023: 8-11.

Roque, N., D. J. Keil, and A. Susanna. 2009. Illustrated glossary of Compositae. Pp 781-806. In: V. A. Funk, A. Susanna, T. F. Stuessy, and R. J. Bayer, eds., Systematics, Evolution, and Biogeography of Compositae. International Association for Plant Taxonomy, Vienna.

Weakley, A. S., J.C. Ludwig, and J. F. Townsend. 2012. Flora of Virginia. BRIT Press, Fort Worth.

Wick, T. J., and A. R. Davis. 2006. Floral nectar production and nectary anatomy and ultrastructure of Echinacea purpurea (Asteraceae). Annals of Botany 97: 177-193.

## *John Dodge, long-time Society supporter, passes*

One of the Society's long-term supporters, John Edmondson Dodge, passed away last November at the age of 89. John graduated from George Washington University with an electrical engineering degree. He continued his education with master's studies at the University of Virginia. John was a U.S. Army veteran who served in Germany. He retired after 32 years working for Atlantic Research Corporation. Later John worked on U.S. Air Force projects in an electronics lab in his basement. After retiring from defense work, John indulged his love of plants and nature by earning his horticulture associate degree from Northern Virginia Community College and his botany master's degree from George Mason University, focusing on environmental studies and public policy. John was active with the Virginia Native Plant Society, including being a past member of the board of directors, and assisted with the *Flora of Virginia*. He enjoyed plant surveys and nature walks in Fairfax County parks and elsewhere, including helping to reduce and remove invasive plants. John was a long-time volunteer at the Smithsonian Institution assisting the entomology department at the National Museum of Natural History.

Survivors include his wife, Priscilla Dodge, two sons and three grandchildren. (www.lowefuneralhome.com) ❖

# *Finding a balance between people and plants*

The pandemic taught us many things about how people react to stressful situations. One coping mechanism was to escape to the outdoors. In many instances, this meant overcrowding at parks and natural areas. People saw public lands as a way to escape the realities of the pandemic. However, it opened land managers' eyes to the realities of overcrowding. Overcrowding meant more trash, overflowing parking lots, crowded trails and overlooks, damaged vegetation, more human and pet waste, and unauthorized activities, like camping. Land managers, already understaffed and underfunded, had to scramble to manage more visitors. The pandemic showed us all a scenario of the public/natural resource interface that we had not seen before. The codified mission of the Virginia Natural Heritage (VNH) program, first and foremost, is to protect Virginia's biodiversity. We also work hard, with limited resources, to provide sustainable access where we can.

From Your Natural Heritage Program

By Wes Paulos
Public Access Coordinator

While the number of visitors has slowly decreased, land managers everywhere are still feeling the effects. Land managers have had to rethink how to balance protecting our most sensitive natural resources while providing public access. One example, prior to the pandemic, is Acadia National Park in Maine. Cadillac Mountain is the most popular destination at Acadia, averaging over two million visitors annually. The park staff recognized years ago that there were direct impacts to the sensitive plant communities on top of the mountain. Sixteen percent of the vegetation is now gone due to millions of footsteps. The rocky bald (low-elevation summit bald, subalpine heath – krummholz, pitch pine woodland, and jack pine woodland) attracts visitors due to its stunning views of the surrounding area and the ease of travel to access it. The summit has a 111-car and bus parking area. Once visitors reach the top, they can strike out in multiple directions to revel at the views. A mile and a half of informal trails (or "social trails") crisscrossed the summit, greatly impacting the vegetation and soils. Part of the management plan for the summit was to cordon off certain areas using a soft barrier system of stakes and rope. Additionally, staff surrounded the islands of soil and plants with sandbags to slow erosion and a campaign to reintroduce the sensitive plants into these areas started. Acadia National Park advanced to a required vehicle permit to limit the number of visitors to the summit. These techniques have slowed the degradation, but the overall public pressure remains at the park.

Virginia Natural Heritage conducted a similar project at Buffalo Mountain Natural Area Preserve (BMNAP) in Floyd County. This preserve conserves 15 rare plant occurrences, three rare animals, and nine significant natural communities. One species is endemic to the mountain—*Puto kosztarabi* (Kosztarab's Giant Mealybug). Plants such as *Sibbaldiopsis tridentata* (Three-toothed Cinquefoil) and *Minuartia groenlandica* (Mountain Sandwort) dot the summit in less impacted areas. One community type is the Southern Blue Ridge high-elevation mafic barren (S1/G1). BMNAP has one of the highest visitation rates in the Natural Area Preserve system due to its spectacular views and short hike. The summit offers a 360-degree view of the Piedmont and Blue Ridge with up to 75-mile visibility on a clear day. The summit of Buffalo is also where most of the sensitive flora and fauna occur. Most flora hold on to a thin veneer of soil that is buffeted by winds and undergoes significant temperature fluctuations. It doesn't take much hiker traffic to trample and kill the vegetation, leaving soils more erosible in the extreme weather. This soil erosion on the summit has been documented since 2006 using photo points. Earlier photos show intact vegetation compared to lack of vegetation and exposed rock of more recent photos.

Buffalo Mountain summit sign explaning the trail system (Jeff Marion)

In 2015, Natural Area Stewards started working on a plan to help save the remaining intact plants. A recreation management plan started with a baseline inventory using square meter plots. Viable solutions were identified to deter visitors from more sensitive areas and encourage them into the most disturbed barren areas of the summit. Once a conceptual trail was developed for the summit, staff surveyed visitors to assess their willingness to accept the trail idea. Of those surveyed, 78% indicated that they would accept the trail system. While 100% cooperation would not be expected, this estimate of adherence to the rules, should prove a benefit to the natural heritage resources.

Natural Heritage inventory biologists reviewed the project, and on-the-ground work began. First, a loop trail from the parking area was constructed by utilizing an informal trail route and incorporating sustainable trail design. This trail took pressure off the original trail while offering a better visitor

***(See Finding balance, page 10)***

# VNPS Workshop one for the explorers

Many folks are of the belief that the human race has found pretty much everything there is to find, that scientists and doctors know just about everything there is to know. Anyone who is a seeker, an explorer, or a wonderer, and is evenly modestly aware of the limitations of science knows that belief could not be further from the truth. This year's annual workshop was titled "A Field of Continued Growth: Recent Botanical Exploration and Discoveries in the Eastern United States" and it was aimed to demonstrate that discoveries are constantly being made by those who search. The workshop featured a number of well-regarded botanists, ecologists, explorers, discoverers, and even some local riff-raff.

Scott Ward was our first speaker; he is a recent addition to Dr. Alan Weakley's Southeastern Flora Team at UNC Chapel Hill and the North Carolina Botanical Garden. For those who don't know, the Southeastern Flora Team is one of the most influential and esteemed botanical research centers in the southeastern United States. They are responsible for the production of the monumental *Flora of the Southeastern U.S.*, containing identification keys to over 10,000 native and naturalized species within its area. According to Scott, they are also planning to release a groundbreaking phone app that contains that same information, plus photos and a totally novel type of "smart" identification key. Scott has already made an impact on the flora and, with his broad geographic and botanical experience, works to develop all types of new identification techniques and data management strategies. He spent his time outlining a few of the many recent discoveries (too many to mention here!) that his team has not only helped to uncover, but also compiled into a central hub of information that is easily accessible for anyone who wants it. Scott emphasized that their approach is integrative and they use information from a multitude of sources including iNaturalist, which means anyone has the potential to contribute. We obviously have a lot to look forward to coming from Scott and the Southeastern Flora Team.

Fire-loving Lily (*Lilium pyrophilum*) (Joey Thompson)

The next speaker, Dr. Justin Thomas, is the director and co-founder of both NatureCITE as well as the Institute of Botanical Training. Justin is a master of grasses, especially the rosette grasses in the genus *Dichanthelium*. He has a unique multidisciplinary approach

***(See Workshop, page 11)***

# Finding balance

***(Continued from page 9)***

experience. Invasive plant spread was top of mind and a major consideration for maintenance of the new trail. By placing the new trail in an existing informal trail corridor, staff could better access areas that had already been impacted by certain invasive plants. Stewards developed informational and interpretive signage to explain why new trails were created and why staying on the trail was so important to the sensitive plant communities. The last step was to develop a trail on the summit including soft barriers. Initial mapping concluded that there were five destination areas where most visitors went and that were already denuded of soils and vegetation. The soft barrier system included and concentrated access to these areas. And, some hard barriers were used to prevent traffic in the most sensitive areas. The soft barrier system consists of 18-inch-high posts with a black rope threaded through them. Barriers are placed along both sides of the trail that widens at each destination area. A sign asking visitors to stay on the trail was placed along the barrier system. The total project cost was $5,600, including specialized tools for the job. A part-time public access technician was hired to interact with the public during peak use times in fall and spring. Social media spread the word that there was increased onsite presence at the preserve. Social media responses to comments reminded visitors that if the preserve parking lot was full, they had to return later or wait for others to leave. Nearly eight years later, BMNAP is showing signs of recovery and hopefully additional measures to ensure sustainable visitor access – such as a permit system – can be avoided.

As access to, and uses of public lands continue to change, land managers will need to adapt with new techniques. More staff onsite is not always an option, so indirect applications like soft barriers and signage will help greatly. Best case, the combination of staff, barriers, signage, and effective outreach will optimize visitor management for flora and fauna, and the public. We will never change the minds of a very small percentage of visitors, but we can alter the impacts of the majority, by using these multi-pronged strategies. ❖

# Workshop

***(Continued from page 10)***

to understanding them that has shed new light on the group. His approach not only uses morphological details of the species, but also considers the behavior and ecology of the multitudinous forms. The rosette grasses are an extraordinarily diverse group with hundreds of species and varieties recognized, many of which are similar in appearance. The question of how many species and varieties there are has a very different answer depending on which botanist you ask. Justin outlined a long history of botanists with hugely different opinions about which species of *Dichanthelium* are which! Among the many lessons we learned in Justin's talk was that ecology can play a critical role in identifying species, hybridization may occasionally play a role in our confusion of some species, and most importantly, our confusion of the genus is largely due to our innate viewpoint as humans. The grasses did not evolve to conveniently fit into our taxonomic paradigms. Many thousands of years of evolution are at play. With modern human disturbance, the world does not look now the way it did at the time of these evolutionary events. Botanists must try to understand this extraordinarily complex group of organisms in a nature that is a bit out of context.

For Part 2 of our Workshop, Lilly Anderson-Messec (aka "Lilly Byrd") gave an amazing tour of Florida's ecosystems including many highlights about recent discoveries. From the Pine Rocklands, Cypress Domes, and Dry Prairie to the Upland Glades and Limestone Steephead Ravines, one thing we learned for sure is that Florida has a lot of endemic species! Even though botanists have studied Florida for several hundred years, we continue to make new findings across the state. Lilly is one of three employees of the Florida Native Plant Society. One of her main duties is surveying for new populations of the extremely rare Florida Torreya, an unusual primitive conifer that is endemic to steep ravines of the Apalachicola River basin. Lilly's work has nearly doubled the known number of known Florida Torreya individuals (from 700 to over 1,200). Sadly, the Florida Torreya has become victim to a pathogen of unknown origin, and its future is uncertain. Lilly has sent cuttings from many of her new Torreya findings to nearby botanical gardens to be propagated in order to protect the tree from extinction. Lilly also discussed her remarkable discovery of *Carex lutea* (a local endemic of North Carolina) in Florida!

Rod Simmons was our fourth speaker of the workshop. Rod is the Natural Resources Manager for the city of Arlington. A seasoned plant ecologist and conservation biologist, Rod painted a picture of the relictual floras of the northern Virginia, adjacent Maryland, and D.C. region. This area is the southern extent of the famed Pitch Pine barrens, an ecosystem which is anything but barren, harboring an enormous diversity of native plants and habitat types.

Rod helped discover a large area of globally rare Pitch Pine barrens communities in the Washington, D.C. region in an area previously believed to be simply pine plantation. The magnolia gravel bogs are another unique feature of Rod's region. Several interesting fern hybrids, including *Dryopteris x boottii* and *Osmunda x ruggii* have been recently discovered from these globally rare wetlands.

Our last speaker of the workshop was Joey Thompson, Vegetation Ecologist with the Virginia Natural Heritage Program. Joey summarized several exciting recent finds in which Natural Heritage staff have been involved. Most charismatic, the globally rare fire-loving Sandhills Lily (*Lilium pyrophilum*) has been found by Fort AP Hill Natural Resources staff and inventoried by Natural Heritage. Several extraordinary fire-managed habitats, including several seepage bogs, were found with numerous new populations of the rare lily. A close second, the Water-spider Orchid, is a "new to the state" orchid that was found during a Master Naturalist conference walk in the Great Dismal Swamp. The Water-spider Orchid is a beautiful and intricate orchid species that occupies floating vegetation mats and pool edges in coastal plain swamps. The orchid seems to be expanding its range, the Dismal Swamp finding is one of several recent new northern records for the water-spider orchid.

Water-spider Orchid (*Habenaria repens*) (Zach Bradford)

To learn more about the workshop, check out recordings of all the presentations at: **https://vimeo.com/showcase/10019429**

*—Joey Thompson is a Vegetation Ecologist with the Virginia Natural Heritage Program.*

# *Hanover youth ballfields decide to go native*

Last winter, when Atlee Little League in Hanover County discussed beautifying its wooded 55-acre campus for 2023, the board of directors decided to test using native plants because of their long-term benefits. The concept was to use natives both to enhance landscaping and to provide an educational demonstration project for the thousands of Little League participants and visitors who pass through the nine-baseball field complex.

The first step was to request an assessment visit from the Hanover Master Gardeners. On a cold December afternoon, the Master Gardeners visited and later prepared a helpful report with many ideas to best utilize the available space for planting natives. Step two was publicizing the upcoming project that resulted in the donation of seven Buttonbushes, the 2022 Virginia Native Plant Society Wildflower of the Year. Step three was an application for a Roddey Jones Memorial grant offered by the Hanover Master Gardener Association.

A row of Buttonbushes, VNPS 2022 Wildflower of the Year, stretches along the ballfield fence.

When the grant was approved, the grateful Little League went to work. The Buttonbushes were planted and signage created. Four planter boxes were built and installed by volunteer labor. A wide selection of native plants, including Yarrow, Hollow Joe-Pye-Weed (2023 VNPS Wildflower of the Year), Mountain Mint, and Spiderwort was purchased at local plant sales and transplanted to the planter boxes for viewing. The four boxes were named after major programs hosted by Atlee Little League to give "ownership" to participants.

After three months in the ground, the Native Plant Project is going well. Plants are blooming and spreading despite dry conditions. After a slow start, most of the Buttonbushes are thriving and there are plans to add another area for them this fall. Atlee Little League thanks the Hanover Master Gardeners for helping to realize the League's vision and looks forward to planning educational events with them in the future.

*—Will Vehrs supplied both the article and the photo for this feature. Sharp-eyed readers will notice that Will's surname is the same as that of VNPS President Nancy Vehrs. That is not just a coincidence. Will is Nancy's brother.*

Virginia Native Plant Society
Blandy Experimental Farm
400 Blandy Farm Lane, Unit 2
Boyce, VA 22620
www.vnps.org

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